Joint BBSO-IRIS-Hinode Observing Plan to study the evolution of Active Region Filaments

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Abstract of Observing Proposal

We propose a joint observing campaign using both ground-based and space-based observatories to examine the formation and evolution of an active region filament from creation to eruption. This will allow the mass-loading of the filament to be studied as well as providing an opportunity to examine the relationship between the magnetic field overlying the filament and the surrounding magnetic field of the active region.

We have been awarded observing time on the BFI, VIS and NIRIS instruments at BBSO from May 1 to May 7 2016. The excellent temporal and spatial resolution observations provided by these ground-based instruments will be used to study the small-scale dynamics of the filament. These will then be complemented by coronal and chromospheric spectra obtained using Hinode/EIS and IRIS.

Both Hinode and IRIS provide essential information about the density, temperature and evolution of the plasma flow into and within the filament that cannot be obtained from the ground. The vector magnetic field information provided by the Spectropolarimeter on SOT also provides a useful comparison for the magnetic field information obtained from BBSO over a much larger field of view.

Request to SOT

SOT-SP normal map repeated as many times as possible during the observing period to see the evolution of the fields along the polarity inversion line.

Request to XRT

Filter: thin-Be, FOV: 384” x 384”, Cadence: 10 s

Request to EIS

We request that EIS study 353 (Heavily compressed (Q=50) slot context raster; 488"x488"; 3.5mins) be run first to allow co-alignment with other instruments, followed by EIS study 420 (HPW021_VEL_120x512v1). Study 420 should then be run

throughout the observing window (approximately 3-5 times), with a final run of Study 353 to provide additional co-alignment information at the end of the observing window (time permitting).

Other participating instruments

IRIS:
We request OBS ID 3620104039: Large sparse 16-step raster with 16s exposure time, 1335/1400/2796/wings slit-jaw (12s cadence, total 50s). This study should be run as many times as possible during the observing window.

If there are any limits on telemetry, we suggest using OBS ID 3620104038: Medium sparse 16-step raster with 16s exposure time.

BBSO:
BFI:
G-band images to allow co-alignment between the BBSO observations and SDO/HMI and SDO/AIA.

VIS:
H-alpha line observing all 11 line positions at the highest possible observing cadence. If very good seeing conditions, use the full field-of-view, for average seeing conditions use 0, +/-0.4 and +/-0.8A to allow good coverage of the line.

NIRIS:
Full field-of-view using the Fe I 1565 nm doublet to measure the Stokes I, Q, U and V.

Remarks

Observing time period:
We request that the plan be run from May 1 to May 7 2016 for 4-6 hours centred around 17 — 21 UT each day to coincide with the optimal seeing conditions at BBSO.

Target:
The primary intended target is an active region filament, or in the absence of an active region filament, then the leg of a quiet Sun filament. The target and pointing will be chosen in advance by the proposer and communicated to the COs in a timely manner to ensure observation.